

**UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF NEW YORK**

FEDERAL HOUSING FINANCE AGENCY, AS  
CONSERVATOR FOR THE FEDERAL  
NATIONAL MORTGAGE ASSOCIATION AND  
THE FEDERAL HOME LOAN MORTGAGE  
CORPORATION,

Plaintiff,

-against-

NOMURA HOLDING AMERICA INC., *et al.*,

Defendants.

No. 11-cv-6201 (DLC)

ECF Case

**AFFIDAVIT OF LEE KENNEDY**

STATE OF CALIFORNIA                     )  
  ) ss:  
COUNTY OF VENTURA                    )

Lee Kennedy, being duly sworn, deposes and says:

1.       My name is Lee Kennedy. I am the founder and managing director of  
AVMetrics.

2.       I provide this affidavit as my direct testimony at trial. My testimony responds to  
the opinions of plaintiff's expert Dr. John A. Kilpatrick regarding the accuracy of appraisals  
performed in connection with the origination of loans underlying the seven Securitizations at  
issue in this Action.

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## **I. BACKGROUND AND QUALIFICATIONS**

1. My name is Lee Kennedy. I am the Founder and Managing Director of AVMetrics, a company specializing in the independent testing of automated valuation models (“AVMs”) for residential properties.

2. My responsibilities at AVMetrics include overseeing all aspects of our analysis of AVMs for clients. I founded AVMetrics in 2005, and I have developed the business over the last decade so it now has a leading position in AVM validation, testing and collateral risk management consulting.

3. I started my real estate career in 1985 by co-founding (with my spouse Lynn Kennedy) RE Appraisal and Consulting Services. During this time, I performed many residential property valuations, including retrospective valuations as an appraiser, and I became a certified appraiser in the State of California when certification was first mandated in 1990. In addition, I assisted in the development and implementation of a computer-based property valuation model for the Ventura County California Assessor’s office. From 1996 to 2004, I was employed by Washington Mutual Bank (WaMu). From 1999 to 2004 at WaMu, I was Vice President and Director of the Alternative Valuation Group, Collateral Risk Management. In this position, I had extensive involvement with AVMs and appraisals of residential real estate. I left WaMu in 2004 to co-found and operate American Reporting Company, a settlement services company based in the Pacific Northwest offering credit, title, valuation, and AVM testing and consulting services. As a member of the executive team, I was responsible for the Alternative Valuations products division, which included AVM testing, as well as auditing and consulting services. In total, I have approximately 30 years of experience in the residential real estate field. My real estate appraisal experience includes performing retrospective appraisals for lenders, as well as analyzing retrospective AVMs as part of the services offered by AVMetrics.

4. I was a significant contributor to the publications entitled *AVMs 101: A Guide to Automated Valuation Models* (“AVMs 101”) and *AVMs 201: A Practical Guide to the Implementation of Automated Valuation Models* (“AVMs 201”). I have also written or contributed to numerous articles for industry journals such as *Money Matters* (a *Wall Street Journal* publication) and several “White Papers” on appraisal-related issues such as AVM cascading logic systems, scoring methodologies and platform integration strategies. I am a frequent speaker and panelist at industry events such as The Predictive Methodologies Conferences and conferences for industry trade groups such as the Mortgage Bankers Association and The Appraisal Institute, a leading international association of real estate appraisers. I have developed educational courses on AVMs, including a two-day course for policymakers and bank examiners at the Office of the Comptroller of the Currency in the risk assessment department, as well as a course for real estate appraisers and modelers that was approved for appraiser licensing continuing education in 50 states.

## II. MY ASSIGNMENT

5. In its amended complaint, plaintiff Federal Housing Finance Agency (“FHFA”) alleges that the Prospectus Supplements for the seven at-issue Securitizations (the “Securitizations”)<sup>1</sup> misrepresented the true value of the mortgaged properties relative to the amount of the underlying loans.<sup>2</sup> The Prospectus Supplements disclosed the aggregate loan-to-value ratios of the loans underlying the Securitizations.<sup>3</sup> The loan-to-value ratio is the ratio of

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<sup>1</sup> The seven securitizations are NAA 2005-AR6, NHELI 2006-FM1, NHELI 2006-FM2, NHELI 2006-HE3, NHELI 2007-1, NHELI 2007-2, and NHELI 2007-3.

<sup>2</sup> See Amended Complaint, *Federal Housing Finance Agency v. Nomura Holding Am. Inc.*, et al., No. 11 Civ. 6201 (DLC) (S.D.N.Y.), ¶ 7.

<sup>3</sup> See DX-1 (Prospectus Supplement for 2005-AR6) at NOM-FHFA\_04811856; DX-2 (Prospectus Supplement for 2006-FM1) at NOM-FHFA\_04729510-511; DX-3 (Prospectus Supplement for 2006-HE3) at NOM-FHFA\_04620928; DX-4 (Prospectus Supplement for 2006-FM2) at NOM-FHFA\_04638360; DX-5 (Prospectus

the loan amount divided by the value of the collateral. The “value” in the ratio was defined in the Prospectus Supplements as the lesser of the appraised value of the property or the sales price.<sup>4</sup> Plaintiff contends that the appraised value of such properties based on appraisals performed by certified appraisers was significantly higher than the actual value of such properties at the time the loans were originated. The result of this overstatement of property values, according to plaintiff, is a material understatement of the LTV ratios in the Prospectus Supplements.<sup>5</sup>

6. Plaintiff has attempted to substantiate its appraisal-related claims with expert opinions from Dr. John A. Kilpatrick, who runs a company called Greenfield Advisors. Dr. Kilpatrick uses his own AVM, called the Greenfield AVM, which he created for purposes of this and related litigation. Based on the outputs of the Greenfield AVM, Dr. Kilpatrick opines as to whether the original appraisals for a sample of loans underlying the seven Securitizations (“Sample Loans”)<sup>6</sup> were “significantly higher than their true, credible, appraised values.”<sup>7</sup>

7. I was asked by counsel for Nomura<sup>8</sup> to evaluate the opinions of Dr. Kilpatrick concerning alleged appraisal bias. Those opinions are contained in the Expert Report of John A.

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Supplement for 2007-1) at NOM-FHFA\_05141984; DX-6 (Prospectus Supplement for 2007-2) at NOM-FHFA\_05591372; DX-7 (Prospectus Supplement for 2007-3) at NOM-FHFA\_04732669.

<sup>4</sup> See DX-1 (Prospectus Supplement for 2005-AR6) at NOM-FHFA\_04811876; DX-2 (Prospectus Supplement for 2006-FM1) at NOM-FHFA\_04729664; DX-3 (Prospectus Supplement for 2006-HE3) at NOM-FHFA\_04621112; DX-4 (Prospectus Supplement for 2006-FM2) at NOM-FHFA\_04638543; DX-5 (Prospectus Supplement for 2007-1) at NOM-FHFA\_05142213; DX-6 (Prospectus Supplement for 2007-2) at NOM-FHFA\_05591579; DX-7 (Prospectus Supplement for 2007-3) at NOM-FHFA\_04732866.

<sup>5</sup> Amended Complaint at ¶ 107.

<sup>6</sup> Dr. Kilpatrick began his analysis with a sample of 796 loans selected by plaintiff’s expert Charles Cowan. Kilpatrick, John A., Expert Report Concerning Accuracy of Appraisals (May 15, 2014) (“Kilpatrick Report”), at 18. He ended up running 672 loans through the Greenfield AVM.

<sup>7</sup> Kilpatrick Report at 3.

<sup>8</sup> The Nomura defendants are Nomura Holding America Inc., Nomura Asset Acceptance Corporation, Nomura Home Equity Loan, Inc., Nomura Credit & Capital, Inc., Nomura Securities International, Inc., David Findlay, John McCarthy, John P. Graham, Nathan Gorin and N. Dante LaRocca.

Kilpatrick, Ph.D. Concerning Accuracy of Appraisals, dated May 15, 2014 (the “Kilpatrick Report”), and the Expert Report of John A. Kilpatrick, Ph.D., dated October 6, 2014 (the “Supplemental Kilpatrick Report”).

8. My opinions are based upon my knowledge of the residential real estate valuation industry and my experience with appraisals and AVMs, both as a lending professional and as an independent tester. My opinions are also based on the analysis I performed on the Greenfield AVM, which was similar in many respects to the analyses that AVMetrics performs on various commercially available AVMs on a periodic basis. I have also relied on materials in the public domain and materials made available to me by Nomura’s counsel.

### **III. SUMMARY OF OPINIONS**

9. The actual sale price of a property in an arm’s-length transaction normally is the best indicator of its value. In the absence of a sales price, there are numerous valuation methods for residential properties that vary in terms of their accuracy and reliability. Of these, an appraisal by a qualified appraiser is the most reliable valuation method in the industry. As useful as AVMs are in a number of contexts, the estimate of value provided by an AVM—and in particular, a retrospective AVM, which is what the Greenfield AVM purports to be—is widely considered to be less reliable than an in-person appraisal. AVMs are not, and should not be, used by professionals in the real estate industry to conclude that an opinion of value offered by a certified appraiser is not “credible” as that term is used in the Uniform Standards of Professional Appraisal Practice (“USPAP”), much less that the appraiser who performed the appraisal did not subjectively believe his or her opinion of value. Nonetheless, this is precisely the approach Dr. Kilpatrick takes when arguing that the appraised values of the Nomura sample properties were systematically inflated. As far as I am aware, an AVM has never been used to measure the credibility of appraisals except in this and related lawsuits.

10. Beyond the fact that, generally, an AVM is not a viable substitute for an in-person appraisal, the Greenfield AVM has problems that make it particularly unsuitable for the task of assessing the accuracy and/or credibility of appraisals. Based on my analysis of the Greenfield AVM, I conclude that Dr. Kilpatrick's model suffers from serious deficiencies that make the outputs of the Greenfield AVM unreliable.

11. First, Dr. Kilpatrick's Greenfield AVM routinely returns values that are dramatically different from the most appropriate benchmarks for market value, namely, the sale price of a property. It is universally accepted in the appraisal industry that an arm's-length transaction generates a sales price that is the best indicator of a property's fair market value. In particular, when applied to the Sample Loans, the Greenfield AVM returns values within 10% of the sale price less than half of the time (44.6%). These results are well below accepted industry standards, and demonstrate that there are serious flaws in the methodology and results of the Greenfield AVM.

12. Second, these weak results are not surprising given that Dr. Kilpatrick has not made his model available to the appraisal industry, and there is no indication that he properly validated or tested the Greenfield AVM against commercially available AVMs. To my knowledge, Dr. Kilpatrick has not subjected the Greenfield AVM to independent testing, which is the custom and practice in the appraisal industry. Instead, Dr. Kilpatrick (and plaintiff) relied entirely on his own purported validation of the Greenfield AVM. The lack of independent testing does not conform to industry standards and renders Dr. Kilpatrick's model suspect.

13. Third, as evidenced by comparing performance using standard metrics, the Greenfield AVM is far less reliable than commercially available AVMs. Unlike the Greenfield AVM, which was developed by Dr. Kilpatrick, commercial AVMs are the product of numerous

experts in creating such models, many of whom have advanced degrees in statistics. Moreover, commercial AVMs are mature products, having been initially developed more than 15 years ago, and continuously refined and improved ever since; a Ph.D. is not a requirement for building these models, but most of the developers of the commercially available models retain many experts working full-time on the models, along with other experienced appraisal, programming and modeling professionals all working continuously to improve the models. It is thus not surprising that the Greenfield AVM produces less accurate results than AVMs that have been tested in the course of commercial experience over a number of years.

14. Fourth, the Greenfield AVM produces wildly inconsistent results depending on the geographic location of the property. AVMs are normally analyzed and validated at the geographic level, as it is broadly understood that the performance of any given AVM varies depending on the location of the subject properties. Dr. Kilpatrick performed no such analysis or validation of the Greenfield AVM, and instead simply asserts that his model provides the “true” value for properties throughout the country. That assertion is inaccurate—the performance of the Greenfield AVM varies greatly depending on the location of the subject properties. My analysis showed that Dr. Kilpatrick’s model is, in fact, unreliable in most areas of the United States.

15. For all of these reasons, the Greenfield AVM has no capability of providing the “true” value of residential properties, and thus the outputs of the Greenfield AVM cannot properly be used to challenge appraisals for loans underlying the seven Securitizations. Because he has not shown that the appraised values of the sample Nomura properties were inflated, Dr. Kilpatrick has not demonstrated that the LTV ratios disclosed in the Prospectus Supplements were misstated.



#### IV. SUMMARY OF DR. KILPATRICK'S CONCLUSIONS

16. Dr. Kilpatrick concludes that a subset of the sample Nomura properties he ran through the Greenfield AVM (208 of the 672) were significantly over-valued in the original appraisals.<sup>9</sup> His conclusion is based on the outputs of his made-for-litigation AVM which, to my knowledge, is not commercially available and has never been independently tested. Dr. Kilpatrick contends that the estimates of value generated by his model are the “true” values of the subject properties. He compares those supposedly “true” values to actual loan amounts in order to calculate new LTV ratios for the Sample Loans. Based on the outputs of the Greenfield AVM, Dr. Kilpatrick opines that for 208 of the Sample Properties, appraisers provided opinions of value that were systematically inflated.<sup>10</sup>

17. Dr. Kilpatrick originally relied on a sample of Nomura properties generated by Dr. Charles Cowan.<sup>11</sup> This sample contained 796 properties.<sup>12</sup> Dr. Kilpatrick then removed (i) 82 properties for which no appraisal could be located in the loan file produced for the purposes of this litigation, (ii) four properties whose loan files he believed contained “insufficient data” (a concept he does not explain),<sup>13</sup> and (iii) 10 properties for which employees at Greenfield Advisors, Dr. Kilpatrick’s firm, could not locate data that was required to run the Greenfield AVM on those properties. As a result, Dr. Kilpatrick ran his AVM on 700 properties in the sample.<sup>14</sup> Dr. Kilpatrick next removed 22 properties either because there were not enough sales in the county where the property was located for the Greenfield AVM’s value to be

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<sup>9</sup> Kilpatrick Report at 4.

<sup>10</sup> *Id.* at 63.

<sup>11</sup> *Id.* at 2.

<sup>12</sup> *Id.* at 18.

<sup>13</sup> *Id.* at 49, n.137.

<sup>14</sup> *Id.* at 58-59.

considered reliable, or because the properties were eliminated by his “cross-validation” filter, described below, which further reduced the sample size to 678.<sup>15</sup> Dr. Kilpatrick then eliminated six properties as “not representative” or because there was “miscoding in assessor records,” although he provides no explanation in his report of how he made those determinations. As a result of this winnowing process, Dr. Kilpatrick ultimately ran 672 properties out of the original sample of 796 through his Greenfield AVM.<sup>16</sup>

18. According to Dr. Kilpatrick, the outputs of the Greenfield AVM showed that the original appraisals of the sample Nomura properties were inflated by an average of 8.92%. In other words, on average, the difference between the opinion of value from the in-person appraisal and the value generated by his model many years later was 8.92%. Such alleged inflation is well within the 10-15% tolerance range most appraisers (and other real estate professionals) view as reasonable grounds for disagreement in reaching opinions of value about a property. Dr. Kilpatrick nevertheless concludes that the outputs of his Greenfield AVM show that the LTV ratios disclosed in the Prospectus Supplements were false.

## **V. ANALYSIS**

### **A. Valuation Methods and Their Proper Use**

19. In typical residential loan underwriting, lenders consider the market value of the property that the borrower proposes to use as collateral. As the Appraisal Institute notes in its guiding text on real estate appraisals, “[m]arket value is generally seen as a reflection of market participants’ perceptions of future economic conditions.”<sup>17</sup> Although there is no way to establish

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<sup>15</sup> *Id.* at 59-60.

<sup>16</sup> *Id.* at 60-61.

<sup>17</sup> Appraisal Institute, *The Appraisal of Real Estate* (12th ed. 2001)) at 53.

the “true” market value of any property, an arm’s-length transaction involving a willing buyer and willing seller provides the best indication of that value.<sup>18</sup>

20. In the absence of a sales price, an in-person appraisal performed by a certified appraiser provides the best estimate of the market value of a property. When determining a property’s value, there are a number of intangibles that are difficult to quantify (e.g., location desirability, proximity to amenities, view, condition, etc.), and especially difficult for an AVM. Two certified appraisers, both complying with USPAP and both behaving in a reasonable, professional and honest manner, can reach different opinions about the value of the same property. As a result, it is widely understood in the industry that appraised values can vary by as much as 10-15% without creating any inference that either of the appraisals is flawed. In short, appraisals are subjective opinions, not objectively determinable facts, and they are bound to vary among professional appraisers.

21. Although less reliable than an in-person appraisal, a well-designed and thoroughly tested AVM can provide an estimate of the value of a property. Unlike the Greenfield AVM, however, such AVMs do not purport to generate a single “true” value for a property. Instead, they generate a range of values that can be used as part of a process to evaluate the range of values produced by an in-person appraisal. In my experience, AVMs are not used by originators of mortgage loans or purchasers of mortgage loans to generate values for properties that are then substituted for the opinions of values reached by certified appraisers. Instead, they are used as screening tools to identify appraisals that warrant closer review. This is an important distinction that seems to have been lost on Dr. Kilpatrick.

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<sup>18</sup> DX-2726 (The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice and Advisory Opinions* (2005)) at 210 (“Market value” is defined as “the most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus.”).

22. Within the time period when the Sample Loans were originated, variances between appraised values and AVM values of between -15% and +25% were commonly accepted by parties assessing the quality of appraisals in connection with residential mortgage-backed securities (“RMBS”). During the 2005 to 2007 time period, Freddie Mac also understood that tolerances of approximately 15% between appraised values and AVM values were commonly viewed as acceptable.<sup>19</sup> These tolerances are not deemed bright-line cutoffs—some parties accepted variances beyond the limits, or considered other factors when assessing variances outside the 15% range. Moreover, parties in the industry typically did not reject an appraisal out-of-hand when an AVM value was outside the party’s tolerance for variances. Instead, the AVM value was seen as a possible reason to further review the loan, such as a review of the appraisal by a human being rather than a computer model.

23. Standard & Poor’s (S&P) guidelines—established at the end of 2008, with the financial crisis well underway—permit variances of up to 10% between appraised values and AVM values before further review of an appraisal by a human being is required. Even under those S&P guidelines, which are more conservative than practices prevalent at the time the Sample Loans were originated (2005-2007), an appraisal is not rejected if a variance of more than 10% exists between the appraised value and the AVM value. Instead, the loan is reviewed more closely. And far from accepting a single AVM’s estimate of value, S&P uses multiple

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<sup>19</sup> See, e.g., DX-119 at FHFA00129493 (Freddie Mac approving Fremont as an originator, when Fremont allowed variances between appraised values and AVM-generated values of up to 15%); DX-116 at FHFA04385474 (Freddie Mac approving First NLC as an originator, when First NLC allowed a 10% variance between AVM values and appraisal values).

AVMs as part of its due diligence process.<sup>20</sup> This is further confirmation that Dr. Kilpatrick's approach is inconsistent with industry practice.

24. Even under Dr. Kilpatrick's flawed Greenfield AVM and calculation method, "the original 672 Nomura sample appraisals were on average 8.92% higher than the true market value of the properties."<sup>21</sup> In other words, the average variance between appraised values and the Greenfield AVM values that Dr. Kilpatrick asserts are the "true" values for the Nomura sample properties is well within the tolerance level accepted above by Freddie Mac and others in the industry.

*1. Dr. Kilpatrick Improperly Relies on AVM Results to Determine the Accuracy of Opinions of Value Produced by Qualified Appraisers.*

25. Appraisals are the most reliable method of valuing properties and thus at the top of the valuation hierarchy, while AVMs are at or near the bottom. In that regard, I agree with Dr. Kilpatrick's statement in the Greenfield AVM manual that "AVMs do not substitute for an appraiser's professional judgment."<sup>22</sup> I likewise agree with the Appraisal Institute's statement that "[a]ny attempt to reduce the appraisal process to the perfunctory application of statistical and regression analyses is a disservice to both consumers and lenders."<sup>23</sup>

26. Appraisals are more credible than other valuation methods because a professional appraiser can conduct physical inspections, use person-to-person interactions with uninvolved

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<sup>20</sup> See Standard and Poor's: Incorporating Third-Party Due Diligence Results Into The U.S. RMBS Rating Process, AVM News, 19-20 (Nov.-Dec. 2008), available at [http://www.lightstone.co.za/LSC/Uploads/AVM%20NEWS\\_V7N1112\\_20081112.pdf](http://www.lightstone.co.za/LSC/Uploads/AVM%20NEWS_V7N1112_20081112.pdf). ("If the first-level review produces a value of more than a 10% variance to the original appraisal value, we would expect the property valuation firm to perform a second-level review by ordering a broker price opinion (BPO), field review, or new appraisal to compare against the appraised value.").

<sup>21</sup> Kilpatrick Report, at 61.

<sup>22</sup> Greenfield Advisors, LLC, The Greenfield Automated Valuation Model (AVM)), Exhibit 5-1 to Kilpatrick Report, at 6.

<sup>23</sup> Appraisal Institute, The Appraisal of Real Estate (12th ed. 2001) at 152.

market participants to obtain added information that might not be shared with the general public, analyze and evaluate various types of data, exclude erroneous or irrelevant data based upon local neighborhood expertise, and, most importantly, exercise judgment. Professional appraisers, moreover, must complete extensive training and are subject to ongoing regulation and oversight by regulatory bodies.

27. In conducting a full appraisal, an appraiser physically inspects the subject property to measure gross living area and make a determination of the property's quality, condition and amenities. An appraiser considers all factors impacting property value, both positive and negative, gathers, and to the extent possible, verifies relevant data from public and private sources, and relies heavily on an understanding of local market conditions, characteristics both desirable and undesirable to local buyers, short-, medium- and long-term price levels, and property types.

28. Notwithstanding the virtues of appraisals, residential real estate professionals understand that any valuation method is not an exact science, and that even qualified appraisers following USPAP guidelines commonly arrive at different opinions of value based on subjective considerations.<sup>24</sup> Indeed, USPAP recognizes that two different appraisers analyzing the same property at the same time may come to different conclusions about the value of that property, yet both appraisals may nevertheless be "credible" as that term is used in USPAP in the context of their Scope of Work and Intended Use.<sup>25</sup> Moreover, real estate professionals generally agree that any valuation method that purports to provide a definitive point estimate of value is suspect on

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<sup>24</sup> *Id.* at 602 ("Even a rounded figure may imply greater precision than is warranted. Because an appraised value is an opinion, it implies a range in which the property value may fall.").

<sup>25</sup> DX-2728 (The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2014-2015) at AO-20, Lines 138- 142.

general principles. Dr. Kilpatrick himself admitted that disputes of less than 10% as to the value of a given property do not mean that one of the two appraisals is necessarily wrong, and that he himself uses 10% as a guideline in determining whether appraisers' opinions of value are "materially different."<sup>26</sup>

29. A residential AVM is a software program that uses mathematical processes to analyze previously collected data and apply various modeling techniques to estimate a home's market value at a particular point in time. The reliability of AVMs has to be determined over a period of time, and in a commercial context, by analyzing how their outputs compare to market values of properties determined in arm's-length sales transactions and the outputs of other AVMs. It is thus necessary to compare the Greenfield AVM's outputs to market value, so its results can be viewed on equal footing with commercially available AVMs.

30. An AVM cannot consider many of the factors accounted for by appraisals, including home quality, condition, views and amenities, privately sourced data, personal expertise about local conditions, and the views of local real estate brokers. An AVM will not consider many other factors—for example, comparables, site size, and living area—in the same way an appraiser is able to do. And a retrospective AVM, though it is supposed to provide a value estimate for a given property as of a specific date in the past, may erroneously rely on information unavailable at the time the appraisal was conducted—for example, if there was a time lag in publishing data about recent home sales.

31. Many of the differences between appraisals and AVMs are due to the fact that an AVM does not consider information that goes beyond the inputs to the model. For a simplified example, if the AVM's inputs are Number of Bedrooms, Square Footage and Lot Size, the AVM

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<sup>26</sup> Kilpatrick Nov. 13, 2014 Tr. at 38:3-39:16

would not discount the value of a property that abuts railroad tracks; the AVM is not programmed to consider that information. In contrast, a professional appraiser with “boots on the ground” would have adjusted for that factor, and, in addition, would have evaluated many other factors as well. These factors might include such things as neighborhood trends and market trends, obtained by reviewing real estate broker listings of comparable properties, as well as conferring with local real estate brokers to consider properties under contract that might influence market values. This additional due diligence by an appraiser can produce a more accurate estimate of a property’s value; it is not the sort of thing an AVM can do.

32. Indeed, the 2010 Interagency Appraisal and Evaluation Guidelines (“Interagency Guidelines”) promulgated by, among others, the Office of the Comptroller of the Currency,<sup>27</sup> and specifically referenced by Dr. Kilpatrick,<sup>28</sup> make clear that “the result of an Automated Valuation Model (AVM), by itself or signed by an appraiser, is not an appraisal,” and that “the result of an automated valuation model (AVM), in and of itself, does not meet the Agencies’ minimum appraisal standards.”<sup>29</sup> If federal bank regulators do not permit mortgage loan originators to use AVMs in lieu of in-person appraisals, it is difficult to see how the outputs of the Greenfield AVM can credibly call into question the in-person appraisals performed at the time the Nomura sample loans were originated.

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<sup>27</sup> Department of the Treasury, Interagency Appraisal and Evaluation Guidelines; Notice, Federal Register, Vol. 75, No. 237 (Dec. 10, 2010) (“Interagency Guidelines”), 77450 (The Interagency Guidelines were issued by the Office of the Comptroller of the Currency, Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, Office of Thrift Supervision, and National Credit Union Administration (NCUA) (collectively, the “Agencies”) to clarify “the Agencies’ appraisal regulations and supervisory guidance to institutions and examiners about prudent appraisal and evaluation programs.”).

<sup>28</sup> Kilpatrick Report, at 76-77 n.173.

<sup>29</sup> Interagency Guidelines, at 77453, 77459.



33. AVMs are less reliable than in-person appraisals for a number of other reasons. In producing an estimate of market value, an AVM typically assumes that the subject property's physical condition is similar to that of surrounding properties.<sup>30</sup> As such, AVMs are most suitable for homogenous, highly conforming housing stock. Conversely, AVMs are not well suited for properties whose conditions require more thorough and individualized assessment. As individual properties age, they are subject to varying levels of repair, renovation, updating and remodeling, which are not typically accounted for in public records or other databases. Missing or inaccurate information about a property's amenities and physical condition will reduce the accuracy of an AVM estimate. In addition, factors such as physical condition and positive and negative site influences—for example, city views and railroad tracks—can have serious effects on property valuations. These factors are not readily available in databases of property information relied on by AVMs. This is particularly a problem for the Greenfield AVM, which relies primarily on tax assessed value in determining the “true” value of a residential property. For these reasons, among others, an AVM value is considered part of a value range, not a definitive pinpoint value.

34. Finally, AVMs are even less reliable in generating value estimates during times of high market velocity and volatility.<sup>31</sup> Market velocity describes how fast and at what volume assets—here, real estate and associated loans—change hands. Market volatility describes the amount of uncertainty or risk concerning changes in the value of assets. The period 2005-2007 was a period of both high market velocity and volatility.<sup>32</sup> This period saw large increases in the

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<sup>30</sup> *Id.* at 77468.

<sup>31</sup> Miller, Norm and Sklarz, Michael, *Distressed-Home Prices: The True Story*, Mortgage Banking (March 2009).

<sup>32</sup> See Federal Housing Finance Agency, House Price Index Datasets, <http://www.fhfa.gov/DataTools/Downloads/Pages/House-Price-Index-Datasets.aspx>.

number of properties sold as well as rapid appreciation in the prices of properties. I have tested numerous AVMs during periods of rapid price appreciation and found their performance to be unreliable for any purpose other than identifying a range beyond which an appraisal may merit additional review. Dr. Kilpatrick's Greenfield AVM, applied retrospectively to the high-velocity, high-volatility period of 2005-2007, is similarly unreliable (and, indeed, more unreliable for reasons discussed later in this affidavit). In contrast, during times of high market volatility and velocity, on-the-ground due diligence by the appraiser (and his or her local expertise) can result in a better estimate of a property's "true" value.

35. In my experience, professionals in the real estate field do not rely on AVM values to make conclusive determinations about the accuracy, reasonableness or credibility of opinions of value offered by certified appraisers, whether individually or collectively. AVMs cannot reliably be used to determine whether an appraiser inflated an opinion of value because there is no way to discern from the output of an AVM the cause of the difference between an AVM's point estimate of value (which, as noted previously, is really an indication of a range of values) and the opinion of value contained in an appraisal. Dr. Kilpatrick's attempt to use his Greenfield AVM to judge the accuracy, reasonableness and credibility of opinions of value offered by certified appraisers is a highly unusual and inappropriate use of AVMs. In fact, it is entirely unprecedented to my knowledge and not supported in the industry.

2. *Retrospective AVMs, Which Is What the Greenfield AVM Purports to Be, Are Not Reliable.*

36. A retrospective AVM is a type of AVM that attempts to produce a valuation estimate for a specific property as of a specified date in the past, generally using only data that would have been available to a contemporaneous AVM as of that date, and making simplifying assumptions (for example, that the property is in average condition). The Greenfield AVM

purports to produce valuation estimates of properties in the period 2005-2007 and thus claims to be a retrospective AVM. But even if the Greenfield AVM was truly retrospective—it is not, in that it relies on data, tax assessed value, from later years—the shortcomings inherent in all retrospective AVMs means that it is unlikely to come up with reliable estimates of property values eight or more years into the past.

37. Retrospective AVMs are expected to produce estimates of value that differ from appraised values obtained at the time mortgage loans were originated. Given this understanding, it is unsound for Dr. Kilpatrick to rely on what purports to be a retrospective AVM in order to judge the credibility of contemporaneous opinions of value offered by certified appraisers. This reliance is even more problematic when one takes into account the specific flaws in the Greenfield AVM, as I explain below.

3. *The Greenfield AVM Improperly Uses Tax Assessed Values.*

38. Tax assessed values are the values tax assessors ascribe to properties for purposes of calculating property tax. Local jurisdictions (counties, towns and municipalities), in accordance with state law, generally conduct tax assessments and determine the methodology to be used in those tax assessments. The methods and practices for determining tax assessed values vary widely by jurisdiction. For example, some states, such as Colorado, assess properties every other year. Other states, such as California,<sup>33</sup> only re-assess property market values when the properties change hands; otherwise adjustments are capped at a marginal annual rate. As a result of these differences, AVMs seldom use tax assessed values as the primary driver of a valuation.

39. Tax assessors generally do not perform interior inspections, and as a result must rely on public data about home size, number of bathrooms, etc., which may be out of date or

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<sup>33</sup> Cal. Const. art. 13A § 2(a).

otherwise incorrect. Moreover, some property owners challenge the tax assessed value of their property determined by the tax assessor in order to reduce their property taxes. As a result, even within a particular neighborhood, tax assessed values are not homogeneous and are often not closely aligned to the actual market value of properties. The deficiencies in tax assessor data present reliability concerns for AVMs that depend on such tax assessor data.

40. Most AVMs use actual attributes of a property, such as the number of bedrooms or the square footage, in estimating the value of a property. The Greenfield AVM appears to rely almost entirely on tax assessed values as its key driver in determining property values.<sup>34</sup> I am not aware of any commercially available AVM that relies primarily on tax assessed values, as the Greenfield AVM does. This is likely the case for a few important reasons. First, owing to the different processes in place by jurisdiction regarding the gathering, storing and updating of data, assessor data is notoriously inconsistent across jurisdictions, and can sometimes contain very high proportions of incomplete or missing data. Second, as a result of the inconsistency across jurisdictions, a tax assessed value by itself is not regarded in the appraisal industry as a substitute for market value. Third, in attempting to address missing data issues, local jurisdictions may not have the skill level or resources required to exercise the most appropriate methods for filling in missing data or creating models to fill those missing fields. In this context, and without properly testing and validation of assessor data, it is not appropriate to use the output of one model, namely, the model used by tax assessors in determining tax assessed values, as the primary input into an AVM. Tax assessed values are a poor proxy for the actual attributes of a property, and the Greenfield AVM makes no effort to account for the different assumptions underlying the thousands of models used by different tax assessors across the country.

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<sup>34</sup> Kilpatrick Report at 33-34.

41. The Greenfield AVM also assumes that tax assessed values are generally stable across the entire United States—state to state, county to county, jurisdiction to jurisdiction, home to home—and makes no effort to adjust the weight given to tax assessed values based on the differing reliability of such data in different jurisdictions. Although some commercially available AVMs incorporate tax assessed values into their analysis on a very limited basis, they only do that when the reliability of those tax assessed values has been validated across jurisdictions. Dr. Kilpatrick made no attempt to do that in the Greenfield AVM.

42. The 2010 Interagency Guidelines concerning appraisals and other methods of property valuation recommend that lenders who wish to use tax assessed values to evaluate properties should conduct validation tests to determine the accuracy of those tax assessed values, similar to the validation performed on AVMs.<sup>35</sup> Because Dr. Kilpatrick has not done this, there is no basis to presume the appropriateness of the Greenfield AVM in general, nor, specifically, the geographic competency of the Greenfield AVM. This means that there is no reason to believe the Greenfield AVM is accurate across different geographic regions. In fact, I performed such an analysis, and the results, *see* ¶¶ 65-68 below, indicate that the Greenfield AVM displays areas of geographic incompetence.

**B. My Analysis Demonstrates that the Greenfield AVM Is Unreasonable and Unsupportable for Several Reasons**

*1. The Greenfield AVM Produces Estimates of Value that Are Dramatically Different from Actual Market Prices.*

43. The standard process for testing or validating an AVM is focused on the AVM's outputs: the model's ability to accurately and consistently estimate the market value for specific properties. The process starts with the identification of an appropriate sample of properties for

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<sup>35</sup> Interagency Guidelines, appendix B at 35.

which benchmark values have been established. These benchmark values should be the actual sales price for recent or pending arm's-length transactions between willing buyers and sellers—the best indicator of market value. To conduct a “blind” test, these benchmark values should be unavailable or “unknown” to the AVM being tested. For this reason, the benchmark properties are usually identified and compiled by a lender or an independent testing service and delivered to the AVM vendor. The AVM vendor runs these benchmark properties through the model and generates the programmed outputs, including the predicted value of the property. These outputs are returned to the testing entity, which then evaluates the results. Dr. Kilpatrick failed to perform this sort of independent testing and validation on his Greenfield AVM.

44. Nonetheless, there was a ready source of potential benchmark properties within the Sample Loans—namely, properties in the sample that were collateral for purchase-money mortgages, each of which has a sales price against which the value estimate produced by the Greenfield AVM can be compared. To evaluate how the Greenfield AVM's value estimates measured up against actual sales prices for Sample Loans that were purchase money mortgages, I replicated the sample construction shown in Dr. Kilpatrick's expert report. Starting with the 796 sample properties, I removed 82 records where no appraised value was provided (null values) and 14 other records that Dr. Kilpatrick did not attempt to evaluate using the Greenfield AVM, resulting in 700 properties. I then removed 22 records because Dr. Kilpatrick said the Greenfield AVM returned values for those properties outside his parameters, and six records because Dr. Kilpatrick labeled them as “non-representative” or subject to “miscoding.” That left 672 records I could use in my analysis.<sup>36</sup>

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<sup>36</sup> See Kilpatrick Report, at 61.

45. Of these 672 loans, 305 were purchase money loans, meaning there was an actual sales price for the property. These sale prices could have—and should have—been used by Dr. Kilpatrick as a test set to gauge the reliability of the Greenfield AVM; Dr. Kilpatrick could have checked the actual sales prices against the estimates of value produced by the Greenfield AVM. Had Dr. Kilpatrick done so, he would have found systematic and extreme deviations between the outputs of his Greenfield AVM and property values determined by actual buyers and sellers. This shows that the Greenfield AVM is highly suspect and unreliable.

46. The standard equation for testing an AVM's error rate is:

$$\% \text{ Error} = (\text{AVM Value} - \text{Benchmark Value}) / \text{Benchmark Value}$$

47. This equation finds the percentage of error between the AVM value and the benchmark value. It is a logical test of the AVM's error because it determines the extent to which the AVM misses the benchmark as a percentage of the benchmark value. Using a property's actual sales price as the benchmark is considered the gold standard in the industry, and doing so is the most widely accepted practice within the AVM testing space.<sup>37</sup>

48. Although in his report Dr. Kilpatrick alters the standard formula for calculating error by using the Greenfield AVM value in the denominator,<sup>38</sup> I properly analyzed the Greenfield AVM's value estimates against the sales price benchmarks in the Nomura sample properties. In other words, I measured deviation between the Greenfield AVM value estimates and the actual sale prices of the relevant properties:

$$\% \text{ Error} = (\text{Greenfield AVM Value} - \text{Purchase Price}) / \text{Purchase Price}$$

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<sup>37</sup> Office of the Comptroller of the Currency, *Interagency Appraisal and Evaluation Guidelines*, Appendix B—Evaluations Based on Analytical Methods or Technological Tools at 34 (“To ensure unbiased test results, an institution should compare the results of an AVM to actual sales data in a specified trade area or market prior to the information being available to the model.”).

<sup>38</sup> Dr. Kilpatrick installs his GAVM value as the benchmark value: (Greenfield AVM Value - Purchase Price) / Greenfield AVM Value.

49. This analysis shows that the Greenfield AVM has extremely high error rates. To illustrate how Dr. Kilpatrick's distorted error calculation differs from the errors calculated according to the industry standard formula, I have included a sample of purchase properties and their absolute errors using this industry standard variance. I've included only the subset of results where the Absolute Variance between the Greenfield AVM value and the Purchase Price exceeds 30%.

| <b>Table 1: Absolute Variance for Sample Loans</b> |                       |                             |  |
|--|-----------------------|-----------------------------|--|
| <b>GlobalLoanNo</b>                                | <b>Purchase Price</b> | <b>Greenfield AVM Value</b> | <b>Industry Standard Absolute Variance</b> |
| NHELI 2007 3 2001856568                            |                       |                             | 594.2%                                     |
| NHELI 2007 1 2002127066                            |                       |                             | 101.5%                                     |
| NHELI 2006 FM1 2002007705                          |                       |                             | 87.1%                                      |
| NHELI 2007 1 2001992416                            |                       |                             | 82.7%                                      |
| NHELI 2006 FM2 2001987494                          |                       |                             | 42.6%                                      |
| NHELI 2006 FM2 2002231958                          |                       |                             | 37.5%                                      |
| NAA 2005 AR6 1001918593                            |                       |                             | 37.0%                                      |
| NAA 2005 AR6 1001901637                            |                       |                             | 36.9%                                      |
| NHELI 2007 3 2001859293                            |                       |                             | 36.1%                                      |
| NAA 2005 AR6 1002007623                            |                       |                             | 35.2%                                      |
| NHELI 2007 3 2002179436                            |                       |                             | 34.6%                                      |
| NAA 2005 AR6 1001902888                            |                       |                             | 34.3%                                      |
| NAA 2005 AR6 1002008905                            |                       |                             | 34.2%                                      |
| NAA 2005 AR6 1002195590                            |                       |                             | 33.2%                                      |
| NHELI 2006 FM1 2002117762                          |                       |                             | 32.4%                                      |
| NHELI 2007 3 2002179104                            |                       |                             | 32.3%                                      |
| NHELI 2006 FM1 2001904269                          |                       |                             | 31.7%                                      |
| NHELI 2006 FM1 2002168258                          |                       |                             | 30.2%                                      |

50. In all, using the industry standard method, there are 122 properties out of 305 properties where the errors in values estimated by the Greenfield AVM exceed 15% (absolute value). The fact that Dr. Kilpatrick has estimated value errors exceeding 15% for a full 40% of the Nomura sample properties for which sales prices were available shows that his Greenfield



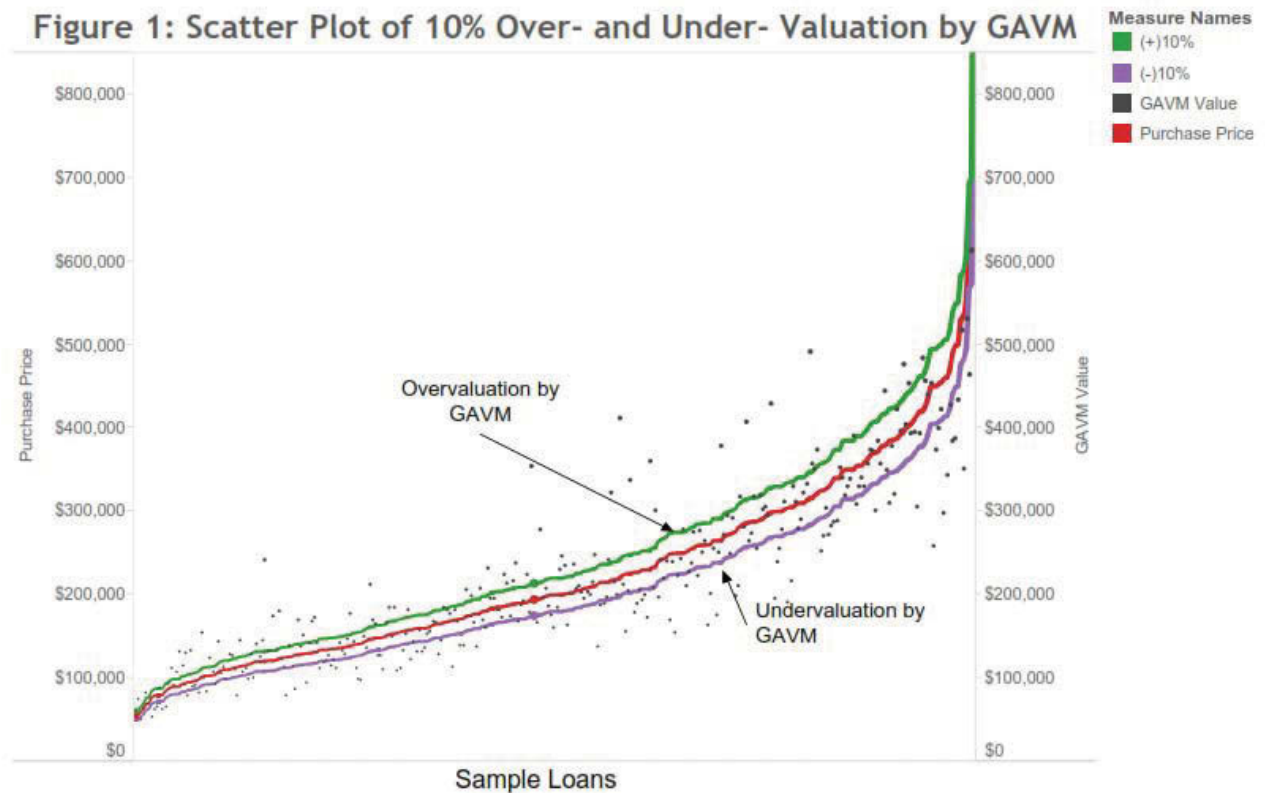
AVM model is unable to do what AVMs are supposed to do—i.e., accurately and consistently estimate market values for specific properties.

51. I understand that Dr. Kilpatrick has attempted to defend his Greenfield AVM's high error rate by claiming that his model is a more reliable measure of market value than the actual selling prices of Sample Loans that are purchase money mortgages. In other words, Dr. Kilpatrick claims his model is more reliable than prices established through arm's-length transactions between a willing buyer and seller. This claim is illogical and a radical departure from accepted industry standards for assessing the reliability of AVMs. As discussed above, actual sales prices are, of course, considered the standard against which AVM values are benchmarked. The actual sales price in an arm's length transactions *is* the market value by definition. By implying that his Greenfield AVM can measure whether actual sales prices reflect market value, Dr. Kilpatrick gets the standard backwards.

52. Another industry standard metric to gauge the accuracy and reliability of AVMs is known as PPE10% (Percentage Predicted Error). A model's PPE10% is determined by calculating, within any given test set, the frequency with which an AVM produces value estimates that are within 10% of the benchmark value. This is an important metric because the more frequently an AVM produces value estimates outside the 10% range, the less accurate and reliable that AVM is considered to be. For the 305 Sample Loans that were purchase money mortgages, the Greenfield AVM returned 169 values (55%) that deviated from the actual sales price by more than 10%. The Greenfield AVM's PPE10% reveals that Dr. Kilpatrick's model is neither accurate nor reliable in producing retrospective property values.

53. The following scatter chart, Figure 1, represents the 305 Sample Loans that were purchase money mortgages that were run through the Greenfield AVM. The horizontal axis

represents the individual properties, evenly spaced, and ordered by increasing sales price, and the vertical axis is the value of the property established by the recorded sales price or the Greenfield AVM value. The red line traces the sales price of each property, with the green and purple lines representing a  $\pm 10\%$  range around each purchase price (PPE10%). This chart shows that the Greenfield AVM has a wide range of predicted values around the market value of the Nomura sample properties established through arm's-length transactions, with many values falling outside the standard error range of  $\pm 10\%$ .



54. As shown in Figure 1 above, the Greenfield AVM routinely under- or overvalues properties. The green and purple lines represent an industry accepted standard of accuracy within which a significant portion of the Greenfield AVM predicted values should fall. Fully 55% of the predicted Greenfield AVM values fell outside of the  $\pm 10\%$  accuracy range; less than half fell within the  $\pm 10\%$  accuracy range. This is way outside the normal expectation for

any reliable AVM. In my experience, most financial institutions and real estate professionals, when assessing the usability of a given AVM, will generally require that the PPE10% be at least 75%, and preferably 80% or higher, but the Greenfield AVM's PPE10% is only 44.6%. This is far below an acceptable level.

2. *The Greenfield AVM Is Unreliable According to Standard Metrics.*

55. I contracted with several AVM vendors to provide retrospective AVM data for the Nomura sample properties, in accordance with usual testing protocols.<sup>39</sup> The purpose of this analysis was to illustrate how widely varied predicted estimates of value from AVMs can be, and, in that respect, how no single AVM—commercially available or newly built like the Greenfield AVM—can reliably predict a property's "true" value. Although none of the commercially available AVMs performed as would be expected if they had been run at the time of the loan origination, it is notable that the results from the Greenfield AVM are generally out of step with the results produced by the commercially available retrospective AVMs.

56. AVM users typically compare AVMs using three main criteria: coverage, predictive accuracy, and the reliability of the AVM's confidence scoring system. Each of these criteria is important to understanding how an AVM will perform, but the weight a user assigns to a particular metric ultimately depends on the user's business objectives and risk tolerance. Given Dr. Kilpatrick's stated objective of ascertaining the "true" value of the Nomura sample properties, any analysis of the Greenfield AVM should focus on its predictive accuracy.

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<sup>39</sup> The AVM models were: i-Val, from Real Info Inc.; CA Value AVM from Collateral Analytics; CMV-P and CMV-AE, both from DataQuick.

57. Some of the more common measures of predictive accuracy are mean percentage error, mean absolute error and standard deviation of error.<sup>40</sup> Using the data Dr. Kilpatrick produced as backup for his appraisal accuracy report, I applied those metrics and others to both the Greenfield AVM and four commercially available retrospective AVMs; the results of this comparison appear in Table 2 below. With regard to the Nomura sample properties, the Greenfield AVM is the poorest-performing AVM model in six out of the eight measurements, and the second poorest performing AVM in one out of the remaining two measurements.

58. One of the most appropriate metrics to consider in assessing the predictive accuracy of an AVM is the mean absolute error percentage, which measures the average magnitude of errors for the AVMs tested. For example, if an AVM overvalued one property by 20%, and undervalued another property by 20%, the mean (average) error would be 0%, making the model look very accurate and masking the effect of overvaluation errors offsetting undervaluation errors through averaging. On the other hand, in the same scenario, the mean *absolute* error percentage would be 20%, since both of the values missed by 20%, regardless of the fact that one was high and the other was low. With a mean absolute error percentage of 17%, the Greenfield AVM is the poorest performing of the five models I compared. On average, the Greenfield AVM missed the actual sales prices by 17%. That is remarkable given Dr.

Kilpatrick's position that an 8.92% difference between appraised values of the Nomura sample

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<sup>40</sup> The Mean (average) Percentage Error is the average of all of the errors in a set of data, both positive and negative. The Absolute Error is the distance—either above or below—of a prediction from an actual value or benchmark. An error of -10% is the same absolute amount of error as a +10% error. Therefore, Mean Absolute Error is the average of the absolute differences for a set of data. The Standard Deviation measures the amount of variation or dispersion from the average. A low standard deviation indicates that the individual data points tend to be very close to the mean, or average, for the entire set of data; a high standard deviation indicates that the individual data points are spread out over a large range of values. Generally, a low standard deviation value is preferred.

properties and the outputs of his Greenfield AVM indicates that the original appraisals are not “credible” as that term is used in USPAP.

| <b>Table 2: Measures of Predictive Accuracy for AVMs Used to Value the Sample Loans</b> |                          |                          |                  |                             |                       |
|---|--------------------------|--------------------------|------------------|-----------------------------|-----------------------|
| <b>Vendor</b>   | <b>Kennedy DataQuick</b> | <b>Kennedy DataQuick</b> | <b>Real Info</b> | <b>Collateral Analytics</b> | <b>Greenfield</b>     |
| <b>Model</b>  | <b>DQ CMV-P</b>          | <b>DQ CMV-AE</b>         | <b>i-Val</b>     | <b>CaValue</b>              | <b>Greenfield AVM</b> |
| Mean Error  | -2.1%                    | -3.0%                    | -3.6%            | 2.1%                        | 2.0%                  |
| Standard Deviation  | 18.3%                    | 19.9%                    | 19.1%            | 19.8%                       | 39.8%                 |
| Mean Absolute Error   | 12.0%                    | 12.8%                    | 14.3%            | 13.0%                       | 17.0%                 |
| Within +/-5% Accuracy   | 32.6%                    | 32.1%                    | 25.9%            | 32.0%                       | 24.3%                 |
| Within +/-10% Accuracy  | 58.3%                    | 54.8%                    | 45.2%            | 58.5%                       | 44.6%                 |
| Within +/-15% Accuracy  | 73.6%                    | 72.4%                    | 59.6%            | 73.2%                       | 60.0%                 |
| Within +/-20% Accuracy  | 87.2%                    | 84.5%                    | 75.0%            | 82.7%                       | 74.1%                 |
| Over (>) 20% Error  | 12.8%                    | 15.5%                    | 25.0%            | 17.3%                       | 25.9%                 |
| BEST  |                          |                          |                  |                             |                       |
| 2 <sup>nd</sup> WORST   |                          |                          |                  |                             |                       |
| WORST   |                          |                          |                  |                             |                       |

59. The fact that the Greenfield AVM has the lowest mean error in the group (2.0%), illustrates the effect, described above, of large overvaluations being offset by large undervaluations. As a further example, if half of an AVM’s results were overvalued by 100% and half were undervalued by 100% that would yield a mean error percentage of “0%” even though every single one of the AVM’s individual results would be off from the benchmark value (i.e., the purchase price of the property) by 100%.

60. By running his own comparisons of the Greenfield AVM to the five commercially available retrospective AVMs in his supplemental report, Dr. Kilpatrick attempts to show that the results of my comparative analysis are incorrect, and he claims that the Greenfield AVM has the best performance in terms of predictive accuracy.<sup>41</sup> He makes this claim by relying on the mean error rate, not the mean absolute error rate. This is the wrong way to make the comparison. The mean error rate of an AVM is the wrong metric to use because of the masking

<sup>41</sup> Kilpatrick Supplemental Report at 9.

effect I described above. If overvaluation errors and undervaluation errors offset one another, the resulting average variance will in fact be low, but the value estimates generated by the AVM are not accurate. As my comparisons above show, the Greenfield AVM performs the worst according to the mean absolute error rate and for five of the seven other measures of predictive accuracy as well.

61. Dr. Kilpatrick relied entirely on the outputs of his Greenfield AVM to opine that a substantial percentage of appraisals for the Sample Loans were overvalued. Different AVMs return different values with varying levels of accuracy, and, to the extent it is possible to prove that an appraisal is not “credible” based solely on the output of an AVM (and it is not), no single AVM should be relied on to the exclusion of others, especially, as was discussed above, when the AVMs are applied retrospectively. The better approach would be to run several AVMs on a given property and assess the results in relation to each other, which Dr. Kilpatrick did not do.

62. In the discussion above I demonstrated how different AVMs return different estimated values for the same properties. To further illustrate the differences among AVMs, I performed another analysis which shows that for only 48 out of 672 Nomura sample properties (7.1%) do the commercially available AVMs all concur with the output of the Greenfield AVM that the variance between appraised value and AVM value exceeds 15%.

| <b>Table 3</b>  |                      |                         |
|---|----------------------|-------------------------|
| <b>Is Another AVM Within 15%?</b>                         | <b>Record Counts</b> | <b>Percent of Total</b> |
| <b>Appraisal Exceeds GAVM by &gt;15%</b>                  | <b>181 of 672</b>    | <b>27%</b>              |
| YES – At least 1 of the third party AVMs is within +/-15% | 133 of 181           | 73%                     |
| NO  | 48 of 181            | 27%                     |

63. The fact that for only 7.1% of the Nomura sample properties do commercially available AVMs concur with the output of the Greenfield AVM that the variance between

appraised value and AVM value exceeds 15% stands in stark contrast to Dr. Kilpatrick's claim that 208 of the appraised values were "significantly higher" than their "true" value as determined by his Greenfield AVM.

64. As noted above, the industry standard benchmark for assessing the predictive accuracy of an appraisal is how it compares to the actual sales price of a property. To further illustrate just how unfounded (and incorrect) Dr. Kilpatrick's opinions regarding appraisal inflation are, I looked at the 305 Sample Loans that were purchase money mortgages and compared how closely the original appraised value aligned with the sales price of the property. For 281 of the 305 (92.1%) of the Sample Loans that were purchase money mortgages, the appraised value was within 10% of the sales price of the property. In addition, the appraised values for 255 of the 305 Sample Loans that were purchase money mortgages (83.6%) fell within 5% of the sales price of the property. This undermines Dr. Kilpatrick's contention that those appraised values were systematically inflated.

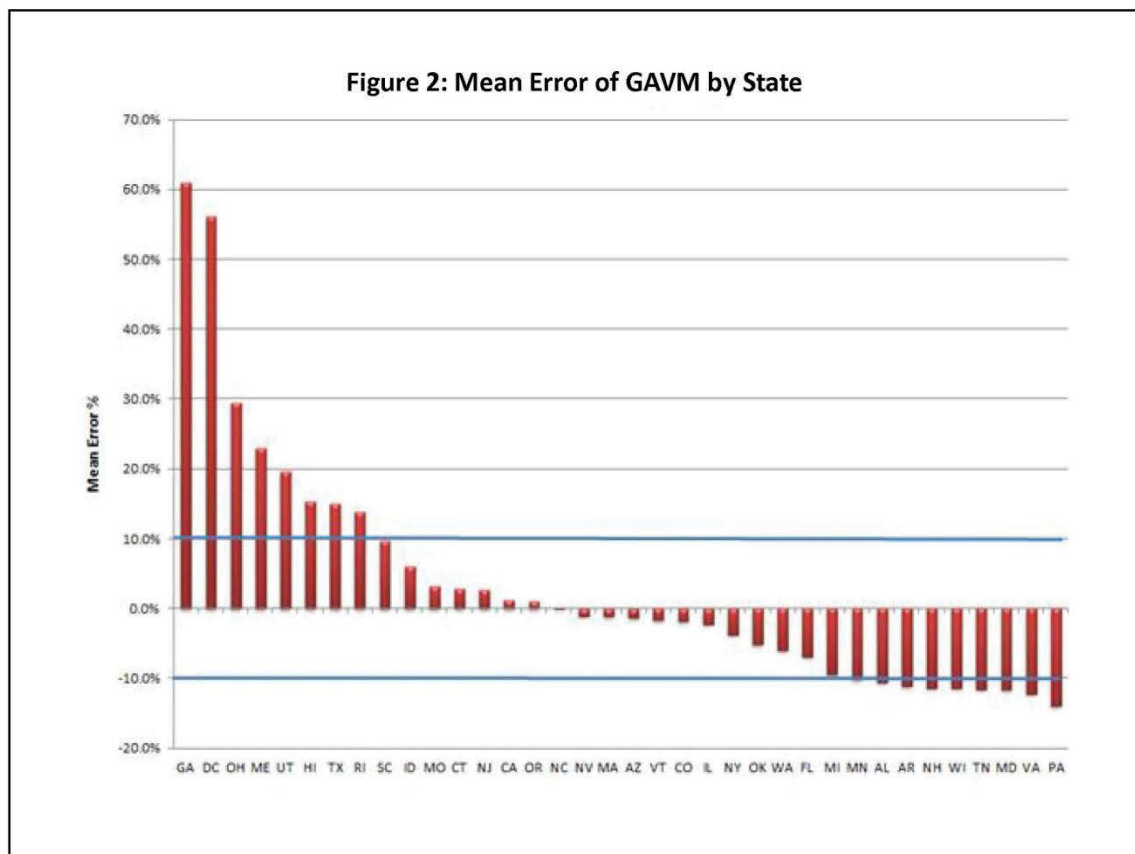
3. *Dr. Kilpatrick Failed to Account for Geographic Variations*

65. Dr. Kilpatrick also failed to account for geographic variations in attempting to validate his Greenfield AVM. To identify areas where model performance falls below acceptable levels, parties validating AVMs typically segment and analyze results by, among other criteria, geography. AVM users understand that the performance of any given AVM varies depending on the location of the subject properties. Accordingly, best practices dictate that a user should tailor his selection of AVMs according to their relative strength in the geographic area(s) of interest. No single AVM can be relied upon to produce a consistent and accurate value estimate for every property in every location.

66. Although Dr. Kilpatrick claims successful validation of his Greenfield AVM in 1,549 counties across the United States, he failed to analyze the performance of his AVM at a



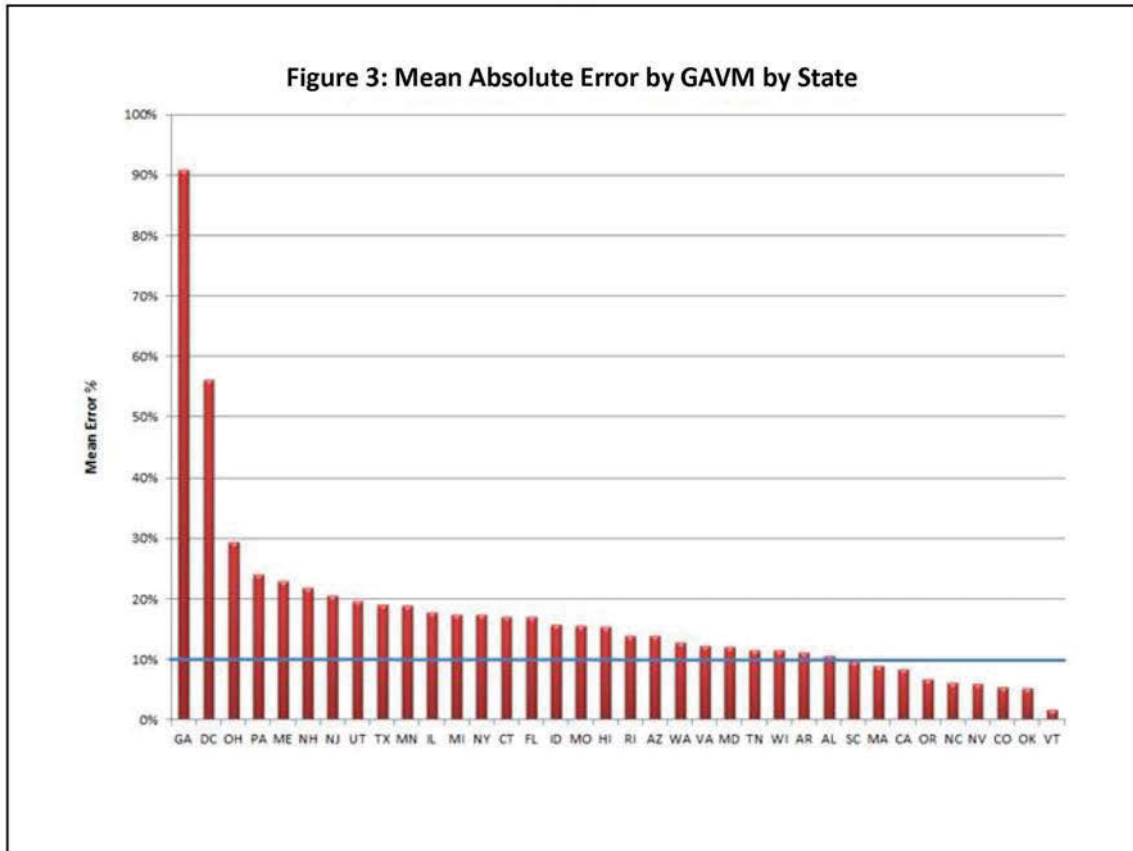
geographic level.<sup>42</sup> As shown in Figures 3 and 4 below, however, the Greenfield AVM's performance varies significantly across different regions of the United States. I reviewed the performance of the Greenfield AVM using Sample Loans that were purchase money mortgages and found that at the state level the model had material variability: using Dr. Kilpatrick's preferred method, the Greenfield AVM had mean error rates exceeding 10% (as shown in the chart) in 17 of the 36 states represented in the Sample Loans; in addition, , mean error rates exceeded 15% in six states. These results demonstrate that the Greenfield AVM is not suitable for use across the United States.



<sup>42</sup> Kilpatrick Report, at 47.



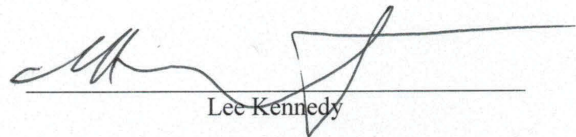
67. When viewed from the perspective of mean absolute error, the variances by state are even more striking: for 27 of the 36 states represented in the Sample Loans, the mean absolute error rate of the Greenfield AVM exceeded 10%, and the mean absolute error rate exceeded 15% in 18 states.




68. By failing to categorize and analyze results by geography, Dr. Kilpatrick's effort to validate his Greenfield AVM ignored the variability of his model's accuracy from state to state. The analysis I performed, the results of which are shown in Figures 3 and 4 above, demonstrate that the Greenfield AVM performs poorly in different parts of the country and is unsuitable for overturning an at-origination appraisal performed by a certified appraiser.

**VI. CONCLUSION**

69. It is my opinion, based on the extensive analyses I have performed, that the Greenfield AVM is fundamentally unreliable and inaccurate. In addition, it is my opinion that the Greenfield AVM has been wrongly used by plaintiff in this case because no AVM is capable on a retrospective basis of establishing the “true,” pinpoint value of a property. At most, an AVM can provide a range of values that can be used as a screening tool to identify appraisals that merit additional review, but no AVM—and particularly not one as flawed as the Greenfield AVM—can be used as the basis for contending that appraisals performed by certified appraisers are not “credible” as that term is commonly understood and also as that term is used in USPAP. Because the Greenfield AVM does not show that the appraised values of the Nomura sample properties were systematically inflated, it cannot be used to establish that the loan-to-value ratios disclosed in the Prospectus Supplements are incorrect.

  
\_\_\_\_\_  
Lee Kennedy

SWORN to before me  
this 20th day of February 2015

  
\_\_\_\_\_  
Notary Public

**CALIFORNIA JURAT WITH AFFIANT STATEMENT**

GOVERNMENT CODE § 8202

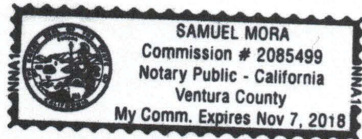
☒ See Attached Document (Notary to cross out lines 1-6 below)☐ See Statement Below (Lines 1-6 to be completed only by document signer[s], not Notary)

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Signature of Document Signer No. 1      Signature of Document Signer No. 2 (if any)

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California  
County of Ventura



Subscribed and sworn to (or affirmed) before me  
on this 20<sup>th</sup> day of February, 20 15,  
by Date Month Year

(1) Maurice Leroy Kennedy

(and (2) \_\_\_\_\_),  
Name(s) of Signer(s)

proved to me on the basis of satisfactory evidence  
to be the person(s) who appeared before me.

Signature [Signature]  
Signature of Notary Public

Seal  
Place Notary Seal Above

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Number of Pages: 33 Signer(s) Other Than Named Above: \_\_\_\_\_